

Zero Retries issue 0178 2024-11-15

Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fourth year of publication, with 2200+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **Eric Guth 4Z1UG** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Jon Pearce WB2MNF** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Florian Lengyel WM2D** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week! WM2D included this nice message:

I let my subscription expire, but that was a mistake. Zero Retries is hands down the best newsletter on developments in Amateur Radio I'm aware of.

My thanks to **David Whitham K3BQ** for *upgrading* from a free subscriber to Zero Retries to an **Annual Paid Subscriber** this past week! K3BQ included this nice message:

This is a great read helping to keep us up to date on our ever changing Ham Radio Universe! I have been promoting Zero Retries to my local amateur radio club.

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

What Dewayne Said - Amateur Radio Superpowers

I mentioned this video - a presentation by Eben Moglen about “Innovation Under Austerity” in a previous issue of Zero Retries. When I initially mentioned it, I wasn’t aware that my late friend and mentor Dewayne Hendricks WA8DZP had a “cameo” in it. My thanks to Malcom Hendricks for pointing that out. Here is the video, again, queued up (I think...) at 1:18:17 for WA8DZP’s brief pitch for Amateur Radio to an audience that has no idea about Amateur Radio.

Cleaned up YouTube transcript (excessive use of “okay” edited out):

Amateur radio has been around for 100 years now and by treaty it's in most countries on the planet. I can take my amateur radio privileges from the United States and go to all those countries and operate just like I was here. Evan talked about we need to have free access to spectrum with no middleman, the Amateur Radio Service is just that there's no FCC in the middle. You can create wireless devices, you self-certify them, and as I said you can take them to other places on the planet and operate them without asking anybody. In fact with the license class I have I can put a communications platform in orbit without asking permission of the FCC. That is powerful so there's a lot of misapprehensions or misunderstanding about what Amateur Radio is about, perpetrated by organizations like the American Radio Relay League. It's all about innovation under your own control you can it gives you complete access to spectrum as long as you don't use it for commercial purposes. So let me just leave you with one thought. Ten years ago I was working for a company called com21 the founder of which was Paul Baran who's sort of known as the grandfather of the Internet. All right Paul basically said look what I've learned is that I look at all these people around building proprietary radios, and they come and go. If you're going to create a business look at mass-produced radios and use those and morph them to your own needs. There's two mass-produced radios today - Wi-Fi and cable modems. With a little construct called a transverter, a transmitter also known as linear translator, you can take the inputs and outputs of a cable modem or any Wi-Fi device and put it anywhere in the radio spectrum and couple that with an Amateur Radio license and now you have cheap hardware that can go anywhere and not ask permission of anybody. So look into this - I mean Amateur Radio, basically I put out devices that you don't have to have an Amateur Radio license to use it. I mean I can, under my Amateur Radio authority, I can have as many transmitters operating in U.S. territory without... and i have people just like you use them. All I have to be able to do is to turn on or off the device. When i was working at com21 we littered the bay area with cable modems, that had transfers and had a wireless internet network that we had a lot of people using so we didn't get any money for it, we didn't charge anybody for Internet access but we provided innovation of a different nature that's it awesome.

Dewayne’s brief talk illustrates perfectly something I’ve said before, but in passing, and at times partially in jest:

Having privileges in Amateur Radio spectrum with an Amateur Radio license is a modern-day technological superpower.

But in retrospect, I shouldn’t have treated this statement so casually as it comes off as a bit of a joke... and it shouldn’t... because that statement is actually *fact*.

We as Amateur Radio operators have *amazing technological and communications capabilities...* if we choose to use them. If we choose to grow our personal knowledge and systems to take advantage of those superpowers.

A few such Amateur Radio superpowers that I’ll be talking about extensively in 2025:

- A dense network of Amateur Radio repeaters that hopefully can be retrofitted with MMDVM hardware to be able to do higher speed data communications.
- A dense network of Amateur Radio digipeaters for use with APRS, APRS capabilities in general, and especially APRS messaging with better, easier to use APRS messaging apps on mobile devices.
- M17 Project open source digital voice / data system - user devices, repeaters, network, etc.
- Flexibility in spectrum choice, meaning that we can run as many as six radios - 10m, 6m, 2m, 1.25m, 70cm, and 23cm simultaneously. Imagine the dense, high performance network we could build if multi band capability was easy and inexpensive.

Need another example of the superpower aspect of Amateur Radio privileges coupled with a bright, curious young mind? See my story in **Zero Retries 0064** - The “Kind of” Amateur Radio Backstory of Apple’s “Emergency SOS Via Satellite” Feature.

Zero Retries' Shiny New Zoom Pro Account

Earlier this week, to “capture” a discussion about Amateur Radio with a newcomer to Amateur Radio with a technical background, I finally pulled the trigger for a Pro level Zoom account. I knew vaguely that Zoom would create an automatic transcript, but didn't know the details.

Minor lesson learned - transcripts are only generated when you “save to cloud”. The Pro level comes with 5 GB cloud storage, and once the transcript is generated, you can easily download the video, audio, and transcript files. So I'll have to use an external transcription tool for *this* video. But what surprised me was the included AI summary of the conversation that I did for a test. That... is going to be a *powerful* tool.

I've been amply busy this year just pushing out Zero Retries and other distractions like managing a number of minor (non-life threatening) health issues. Thus I had not prioritized the Zoom Pro account or another near term project that I expect to be equally impactful.

I “knew” about the power of Zoom transcriptions... but experiencing it firsthand... wow, that is going to be one heckuva a powerful tool for expanding Zero Retries in 2025.

A frustration I've had for some time is that I don't think that many of the most Zero Retries Interesting stories are getting told; the really interesting people aren't being interviewed, and if they are interviewed, the questions they're being asked aren't the most interesting ones, such as asking about their childhood rather than asking about the technologies that they're pioneering. Presentations are good, as far as they go, but there's a lot of detail that can be gained in direct interviews.

But I didn't want to start doing such interviews myself until I was ready with a toolset to fully “capture” that information... like Zoom with transcripts and AI summaries.

In 2025, I intend to do at least weekly Zoom videoconferences with folks that are doing Zero Retries Interesting work. I can certainly spare one or two hours per week to have such interesting conversations, and then Zoom does the heavy lifting with creating a separate audio track, a transcript, and an AI summary that I can then use for Zero Retries. It's possible that I may make the Zoom interview open to others to watch, and perhaps participate via the message capability. If I do... and this isn't definitely decided, the limited “participation” will be offered to the Zero Retries paid subscribers as a Thank You for their financial support.

It's possible that I'll edit the videos and post them on YouTube... but video editing is a skillset I haven't developed, and of course, video editing will take additional time. We'll see...

In saying all of this, I'm certainly not alone in the (future, for me) creation of Zero Retries Interesting videos and interviews. One example is one of this week's stories - **State of the NinoTNC (Video)** by a local Amateur Radio club in my area.

Another recent great Zero Retries Interesting interview was [Ham Radio Workbench episode 215 - TNC's and Trackers with Scott N1VG From Argent Data Systems](#).

I had long been curious about the scope of Argent Data System's products, and this excellent, extended interview answered all my questions about N1VG's background, motivations, capabilities, and Argent Data Systems - kudos to the Ham Radio Workbench team for this one!

Another source of Zero Retries Interesting interviews is Eric Guth 4Z1UG's QSO Today Amateur Radio Podcast. An example of a Zero Retries Interesting interview recently is [Episode 496 - Irad Deutsch 4Z1AC](#). 4Z1AC is the author of the excellent VarAC companion application for use with VARA FM and VARA HF that creates an email (and many other) capabilit(ies). As I experienced with [my QSO Today interview](#), 4Z1UG is a skilled interviewer.

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities!

Steve N8GNJ

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State of the NinoTNC (Video)

By Steve Stroh N8GNJ

The [NinoTNC](#) remains in active, incremental improvement.

Presentation at the San Juan County Amateur Radio Society (videoconference) meeting on 2024-11-08:

The presentation is by Nino Carrillo (KK4HEJ) and Tadd Torborg (KA2DEW) of the Terrestrial Amateur Packet Radio Network (TAPRN) project. They are discussing a CRC extension that's been added to the Improved Layer 2 Protocol (IL2P), as well as the latest firmware improvements for the NinoTNC.

My thanks to Larry Gadallah NM7A for bringing this presentation to my attention.

The continuing refinement of the capabilities of the NinoTNC are impressive. 1200 bps AFSK used to be the most effective data rate / modulation because it was the most forgiving of widely varying types of modems, audio level mismatches, different types of radios, etc. But the improvements in the firmware and algorithms of the NinoTNC, and especially the interleaved Forward Error Correction that KK4HEJ developed - IL2P, have enabled high speeds such as 2400 bps and 3600 bps using the same radios (microphone and speaker connections) and the same level of reliability and interoperability. KK4HEJ has been working with the John Langner WB2OSZ of DIRE WOLF and Jonathan Naylor G4KLX of MMDVM (MMDVM-TNC project) to support those faster speeds / modulations / integration of IL2P in their respective projects.

There are also some improvements in the NinoTNC for data modes on HF.

What's most significant with these advancements isn't the incremental bump in data rates over the air... it's the significant increase in the *overall reliability of the communications*. These new modes are faster not just because of more data transferred per second, but also that the data doesn't need to be retried / retransmitted nearly as often as "traditional packet radio" (with no FEC) due to an error being received, requiring a retransmission and consuming more channel time. Of course, "Zero Retries" is the ideal condition 🤝, and these newest modes in the NinoTNC and other Amateur Radio data projects.

But... as impressive as these modes are, there's more work to be done. These modes are "static" - lock them in and transmit. But you can't "mix and match" different modes on the same channel - a NinoTNC set to operate at 2400 bps will not decode a NinoTNC set to operate at 3600 bps, so they cannot interoperate, and may not even recognize that the other mode is actively transmitting on the channel.

To be fair, "static speeds" isn't an issue of the NinoTNC because it was designed around the use case of [TARPN](#) networks, which are essentially a series of Point to Point links. Thus the two end points of each PtP link work out their highest common (reliable) speed, and call it good.

For usages beyond TARPN networks, the issue of "non dynamic common parameters" is where VARA FM (and HF) demonstrates its brilliance of design. VARA FM stations actively negotiate with each other to use the highest common speed... and being able to detect that other (VARA FM) stations are using the channel, no matter what parameters are being used in a data transfer. Being able to "upshift and downshift" the speeds dynamically, VARA FM users *can* use a single channel with different stations with different capabilities. There is nothing (that I'm aware of) equivalent within Packet Radio to match this capability of VARA FM.

KK4HEJ touts the advantages of implementing these higher performance modems and algorithms in a reasonable performance microcontroller. The modem and algorithms don't have to contend with latency between a modem connected via USB or latency from multitasking other applications, or even taking into account the issues of writing an app to adhere to the requirements of the operating system. Instead, using a microcontroller, he's able to "write to the bare metal" of the microcontroller and control all aspects of his application with no "overhead" issues.

But, again, as VARA FM demonstrates, even with those very real disadvantages, there are advantages to be had using a commodity, high(er) performance computer such as a Windows PC or Linux on a Raspberry Pi 5. One of those advantages which seems mostly theoretical at the moment (again, as far as I'm aware) of being able to run all modems simultaneously, and thus be able to dynamically select which modem is in use in any given transmission. Station A transmits using legacy 1200 bps AFSK, and that's easily detected by the receiving station's "Legacy 1200 bps AFSK modem", and then can reply using the same mode. On the same channel, Station K transmits using NinoTNC 3600 bps with IL2P error correction, and that's also easily detected by the receiving station's "NinoTNC 3600 bps with IL2P" modem, and can reply using the same mode. That's a lot of overhead to run all of those modems simultaneously on the chance that they might be needed... but in this era, processing power to be able to do so is cheap, Cheap, *CHEAP*, *CHEAP*! And getting steadily cheaper.

Two examples of why this approach is increasingly practical:

- In the early days of Packet Radio, we needed / wanted faster data links, but getting such fast data out of a radio and into a general purpose computer was problematic, and thus required specialized hardware such as HDLC controllers, Direct Memory Access (DMA), etc. In the 2020s, general purpose computers are so fast that it's more efficient to simply sample an A/D converter (audio interface) many thousands of times per second. That's a brute force approach, but with the unused processor time on a typical general purpose computer, it works fine.
- The [DIRE WOLF](#) software TNC began an innovative approach that when a single bit error was detected, it attempts a series of "bit flips" to see if changing the state of one bit made the Cyclical Redundancy Check (CRC) to pass and thus not requiring a retransmission (and the additional overhead on the channel). *It does this for every single bit in the packet.* This is hardly an efficient approach (it may not be possible with a

microcontroller)... but because there is so much unused processor time on a typical general purpose computer... even a Raspberry Pi, it works fine.

I don't claim to understand, nearly well enough, how the new [ka9q-radio](#) software works, but it couples a software-defined receiver to a general purpose computer and processes the incoming "raw I+Q" data stream into many discrete receivers, sufficient to be able to simultaneously decode all transmissions on the (example) 2 meter band at 144-148 MHz. KA9Q has written "receivers" for FM voice, and legacy 1200 bps AFSK packet radio. It may be possible, or not (again, I'm not yet knowledgeable enough to say) to extend ka9q-radio to operate multiple receivers such as 1200 bps AFSK or 3600 bps AFSK with IL2P, on the same channel.

And... there's yet another approach for the issue of sharing a channel between multiple radios that may not be using the same parameters and thus wouldn't be able to "hear" each other... transmitting a universal header that can be recognized by every radio.

Imagine that every radio transmits a very brief header in a standard modulation, standard format, with a "mode ID" that describes what its technical capabilities are.

This is different than the "training sequence" used by landline modems where the handshaking extended to multiple seconds as the modems transmitted and received each other's various modes, sequentially:

300 bps? *Me too.* 1200? *Me too.* 2400? *Yep.* (etc.)

First, such a universal header would have to be able to accommodate tens of thousands of different modes. What is transmitted is only a number - perhaps 8 alphanumeric characters? The technical description of the mode is saved in a lookup table that the radio can quickly query upon receiving the header - is the header that it heard compatible with this radio?

My description here is only the barest wisp of the idea, but hopefully that's enough to get the point across for such an approach. Doing this is feasible, especially now that we're nearly to the point of widespread Software Defined Transmitters that can easily switch modes from "universal header" to a more specialized mode.

Lastly, it's decades too late to incorporate a "universal header" into the myriad legacy devices such as APRS trackers and dedicated APRS radios, so every new device that incorporates a universal header will have to decode and interoperate with 1200 bps AFSK, and probably 9600 bps FSK... to accommodate all those beloved Kenwood APRS radios that will continue to be used well into the coming decades.

I suggest these various thought experiments to illustrate the fallacy that "Packet Radio is dead", no one is innovating in Amateur Radio, etc. Most of what I'm discussing above can be addressed in the software realm - not much new hardware is needed. Thus there's ample reason for experimentation and development in Amateur Radio that could be proxied beyond Amateur Radio, much like experimentation with APRS in Amateur Radio led to the development of Automatic Identification System (AIS) in the marine industry.

Lastly, while it's laudable for KK4HEJ, WB2OSZ, G4KLX, and (as mentioned in the video) G8BPQ to all be coordinating support of these new modes in their respective products / projects, wouldn't it be better to be doing such coordination at scale, in formal technical standards? I imagined such an organization which I titled Amateur Radio Standards Organization (ARSO). At the moment, there is no such organization, in existence, or proposed... but I make the case in the previous articles, and perhaps in this article, about why there should be such an organization.

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

RadioMail 1.4 - The "Audio Frequency Shift Happens" Release

Georges Auberger WH6AZ in an announcement email:

Introducing a Software Modem for Packet

To get emails on the air with RadioMail, you can use the AX.25 protocol, commonly known as packet radio. Although it's an older technology with modest throughput, it remains widespread and is still used in many areas. Currently, there are over 1,200 Winlink stations accessible via packet.

Previously, using the packet protocol with RadioMail required a TNC, specifically a KISS TNC. This type of TNC follows the KISS protocol, enabling host applications like RadioMail to communicate with it. A KISS TNC typically combines a 1200 baud AFSK (Audio Frequency Shift Key) modem, which encodes and decodes data into audio symbols, and a sound card that converts digital sound into analog. Additionally, a TNC controls the radio's PTT (Push-To-Talk), which is crucial for connection-oriented sessions, such as those used by Winlink.

KISS TNCs are available in radios like the Kenwood TH-D74/75 and the PicoAPRS. They can also be standalone devices, such as the Mobilinkd TNC, which can connect to any existing radios.

The specification for a 1200 baud AFSK modem is well-documented and manageable by most modern computing platforms. So, why hasn't RadioMail included a built-in software modem? The main challenge is that RadioMail must not only be able to send analog audio to the radio but also control the PTT.

Until recently, most sound interfaces for amateur radio required serial or USB HID commands to trigger PTT. However, Apple's restrictions on USB peripheral access in iOS made this approach infeasible.

Fortunately, Denis K0TX has addressed this issue by introducing two new sound interfaces: the DigiRig Lite with a USB-C connector and the

DigiRig VOX cable, which includes a passive PTT circuit on a TRRS audio cable.

These devices allow the PTT to be triggered by sending a tone on the right audio channel. The tone is intercepted by a circuit and isn't transmitted to the radio. This enables RadioMail to control the PTT and ensures a fast switch between sending and receiving.

...

Creating a High Performance Modem

With the hardware side solved, the next challenge was developing a software modem. What exactly does a packet modem need to do? For AX.25, the basic modulation uses the Bell 202 standard, originally for old telephone acoustic couplers. It performs well with limited bandwidth, like phone systems. Sounds simple, right?

Not quite. Typically, the sound card connects to the microphone and headphone jack of the radio, a channel designed for voice. The radio applies signal filtering to enhance voice quality, mainly through emphasis. This process boosts higher frequencies, with the receiving radio later reducing them via a low-pass filter.

However, this symmetry is not always perfect. Sometimes, the sending radio may or may not apply emphasis, and the receiving radio might not compensate correctly. For digital signals, this can result in the higher tone being either attenuated or amplified by several dB compared to the lower tone, a phenomenon known as "twist." The Bell 202 standard requires a 1dB flatness, but over an amateur radio voice channel, twist can reach +/-9dB.

What does this mean for the demodulator? It needs to manage different levels of attenuation and adjust accordingly. My goal was to deliver a seamless user experience so users wouldn't need to worry about the type of radio they use. The solution chosen is to run nine decoders on the received signal simultaneously, aggregate the results, and retain only the error-free frames. This approach ensures excellent decoding performance regardless of the radio used.

I'm pleased to report that with this approach, the RadioMail modem achieves about 93% successful decoding of thousands of off-the-air transmissions recorded in Los Angeles on a busy afternoon. Those recordings are available on the [TNC Test CD](#), a benchmark for TNCs.

If you're interested in learning more about modem functionality, I highly recommend exploring the educational material on the theory of [AFSK demodulators](#). Special thanks to Rob WX9O from Mobilinkd for providing this valuable information.

Simple Setup

1. Connect the DigiRig to your device and radio.
2. In RadioMail Settings, select the Packet Modem option.
3. Use the audio monitor and diagnostic tool to ensure that the radio volume is set correctly for optimal decoding, and the device output audio volume is high enough to properly trigger the PTT, without saturating the radio signal.

Once configured, you're ready to connect to a nearby packet station.

Compared to RadioMail's previous versions that depended on external devices for the modem function, RadioMail version 1.4 represents a *lot* of work and is a significant accomplishment! WH6AZ is one of the few who is willing to work gingerly through the minefield of Apple's *many* requirements and limitations and restrictions for running apps on IOS devices without the potential for lucrative payback from a large market if an IOS app takes off. Amateur Radio data is a niche of a niche, so kudos to WH6AZ and other Amateur Radio developers for even *attempting* to develop apps on IOS on behalf of Amateur Radio.

In the bigger picture, with applications and interfaces like RadioMail and APRS.FI on IOS, Amateur Radio data communications is becoming more approachable (friendly) and usable by those who use their phones (and tablets) as their primary device, and thus may begin to win more interest in Amateur Radio.

RepeaterBook Route Search - Coming Soon

RepeaterBook on Facebook:

We're putting the final touches on a new search that allows you to create a route with Google maps and then automatically populate repeaters along that route.

Stand by for more information coming soon.

...



Find Repeaters Along Your Route

Route

Starting Location:

Chicago, IL

Destination:

Dayton, OH

BAND OR FREQUENCY (Select at least one)

☐ 10m

☐ 1.25m

☐ 23cm

☐ 6m

☒ 70cm

☒ 2m

☐ 33cm

MODE (Select at least one):

☒ FM

☐ H17

☐ System Fusion (C4FM)

☐ DMR

☐ NXDN

☐ D-Star

☐ P25

FEATURE:

☐ AllStar

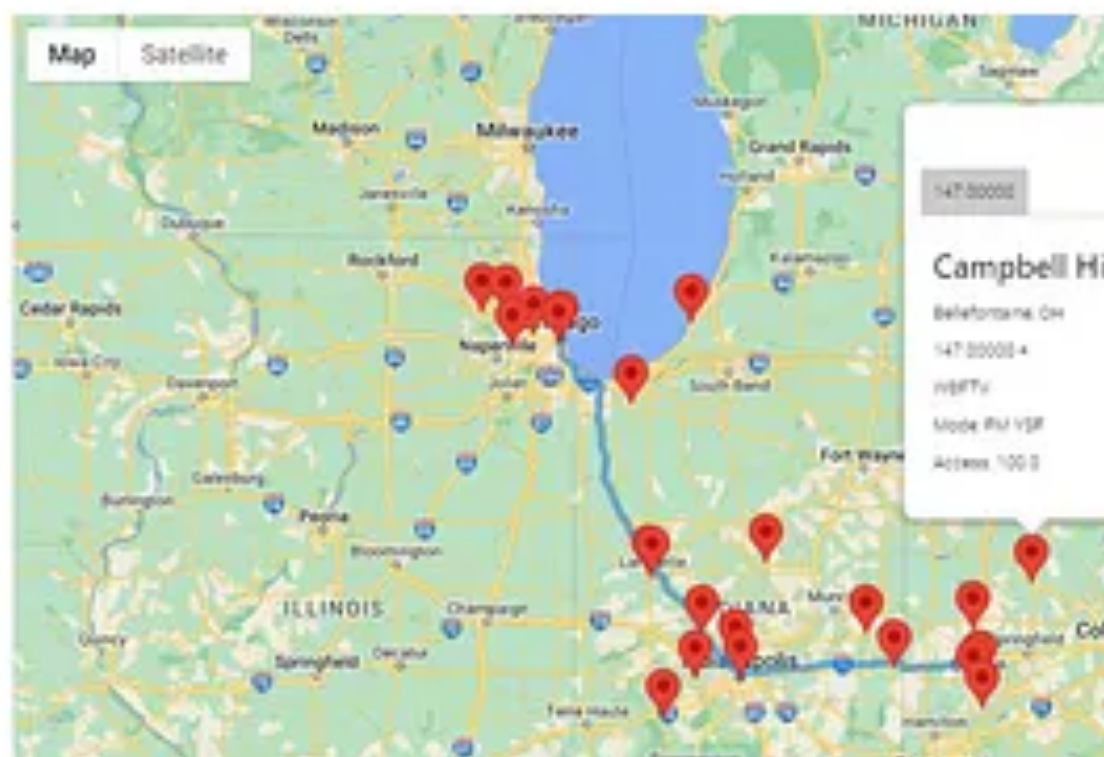
☐ DMR

☐ Autopatch

☐ iWRES-X

☐ EchoLink

Find Repeaters





	Access	Call		ST/PR	Use
444.47500+	136.5	KB9SGN	Cloverdale	IN	OPEI
145.49000-	123.0	WBCE	Springboro	OH	OPEI
145.11000-	67.0	WBCH	Dayton	OH	OPEI
146.98500-	123.0	WFSM	Dayton	OH	OPEI
145.13000-	88.5	WX9HC	Darville	IN	OPEI
444.32500+	136.5	KB9SGN	Indianapolis	IN	OPEI
444.55000+	110.9	N9CZV	Richmond	IN	OPEI
442.65000+	77.0	KH9E	Indianapolis	IN	OPEI
443.32500+	103.5	K9NDZ	Modoc	IN	OPEI
147.10500+	77.0	N9HLL	Lebanon, Boone County Jail	IN	OPEI
145.23000-	100.0	WBFW	Troy	OH	OPEI
147.00000+	100.0	WBFTV	Bellevue, Campbell Hill	OH	OPEI
444.17500+	131.8	KASVXS	West Lafayette, IN Veterans Home Water Tower	IN	OPEI
145.25000-	173.8	KASVXS	West Lafayette, IN Veterans Home Water Tower	IN	OPEI
442.11250+	173.8	N9COP	Greentown	IN	OPEI
146.79000-	107.2 NAC 659	WB9ABQ	Elgin	IL	OPEI
443.10000+	114.8 NAC 293	WB9PHK	Schaumburg	IL	OPEI
145.23000-	107.2	K9IIC	Schaumburg	IL	OPEI
442.87500+	114.8	W9YRC	Downers Grove	IL	OPEI
444.47500+	114.8	W9CCU	Downers Grove, Butterfield and I-555	IL	OPEI
146.67000-	107.2	WB9AET	Melrose Park	IL	OPEI
442.62500+	114.8	W9FT	Melrose Park	IL	OPEI
442.17500+	114.8	AB9QV	Chicago	IL	OPEI
147.15000+	107.2	W9SRD	Chicago	IL	OPEI
146.68500-	173.8	N9IAA	Valparaiso	IN	OPEI
442.77500+	88.5	WBMAI	Bridgman	MI	OPEI

Current Language: English

If you have an iPhone/iPod/iPad or Android device, please download the official Repe



Like Follow Subscribe



Image courtesy of RepeaterBook.com

We thought you might enjoy a screenshot of the new route search BETA we have been developing. We are still working out a few details. Below is a trip from Chicago, IL, to Dayton, OH. The list includes only wide-area repeaters that are marked operational. The markers are clickable so you can associate the marker with the repeater in the table below. There are some other bells and whistles we are contemplating, but we are interested to hear your ideas!

There are a few more details about [RepeaterBook Connect](#) on their web page:

Set your radio directly from the RepeaterBook app using your radio's existing USB cables, Bluetooth interface, or Bluetooth module.

Features

- Touch a repeater to instantly set your radio for the Repeater you require. No more fiddling with CTCSS, frequency, and offsets.
- The best repeater data straight to your radio.
- Connect using your radio's existing USB cables, third-party Bluetooth, BlueCAT Bluetooth interface, built-in Bluetooth module, etc!
- Use the connection you already have. No extra hardware is needed!
- Easy and safer for mobile use.

I had imagined something like this for several years with the emergence of larger tablet computers with GPS input and a database of repeaters. If my radio in my car has (for example) an effective range of 25 miles, then there would be a 25 mile ring around my car's location and within that ring, accessible repeaters which I could then tap to see info about them, and optionally with something like a long tap, send those parameters to my radio and then allowing me to chat on that repeater without fussing with the arcane settings on the radio to set sub audible tone, etc.

This capability is a reasonable equivalent of my idea, ideal for pre-planned long trips like our recent car trip from Bellingham, WA to San Ramon, CA to attend Pacificon 2024. This capability might well tip the balance of the hassle of setting up the Kenwood TM-D710GA radio in the car for long distance travel towards convenience and fun again. What I really like is the convenience of tapping on various repeaters and trying them. If one isn't fun with someone responding for a chat as I'm passing through, I can just try the next one.

What would really be cool is with this capability that repeater owners / groups could start "advertising" their repeaters on RepeaterBook to be "friendly to travelers" - just announce your call and one of our friendly repeater denizens will be happy to chat with you".

[Introducing ARDC's 44Net Program Manager John Burwell KI5QKX](#)

Rosy Schechter KJ7RYV, Executive Director of ARDC, on the ARDC:44Net email list:

I'm writing with some exciting news!

ARDC has one more hire that we're pleased to announce. On Monday, November 4, John Burwell KI5QKX joined the ARDC staff as our 44Net Program Manager. John's role will be focused on the 44Net community: leading related communications, development of documentation and training materials, coordinating volunteers, and overseeing the administration of 44Net services, including the Portal and the Point-of-Presence (PoP) project.

If John's call sign looks familiar, it may be because you may have met him here within the community. His discovery of 44Net a few years ago is what motivated him to get his amateur radio license so he could start experimenting, and over the years he's popped up in various conversations on the mailing list and at some of our community events. You can learn more about John in our recent blog post: <https://www.ardc.net/ardc-welcomes-44net-program-manager-john-burwell-ki5qkx/>.

In the coming weeks, John is going to be working closely with Chris to learn everything about 44Net, including Portal administration. He's also going to become the primary point of contact for the mailing list and related subgroups on ardc.groups.io, so you will see him answering inquiries more and more.

Please join us in welcoming John to ARDC!

The linked article above had a bit more about KI5QKX's background:

ARDC is pleased to welcome our most recent addition to the Tech Team: 44Net Program Manager John Burwell KI5QKX, who joined our staff on November 4, 2024. His role will focus on ARDC's 44Net community, leading related communications, development of documentation and training materials, and overseeing the administration of 44Net services, including the Portal and the Point-of-Presence (PoP) project. In joining the ARDC staff, John states, "ARDC has an incredible resource in its community. 44Net and the people behind it are living legends. It's absolutely a privilege to help ARDC help hams. I can't wait to see what comes next in this chapter of the ARDC story."

About John

Based in Houston, TX, John brings an array of technology experiences to ARDC, including experiences at startups, well-established organizations, and community organizations. His previous work involved building infrastructure and software in industries ranging from newspapers to Houston's energy sector, all of which he continually sought opportunities to learn, explore, and find new ways to help people

benefit from communications technology.

John's first exposure to amateur radio was during his days as a Scout. Though he didn't get licensed immediately thereafter, he developed a curiosity in electronics, programming, networking, and the internet, which ultimately shaped his career. After several years of building wired and wireless networks for businesses, he was motivated to get an amateur radio license in 2021 upon discovering 44Net and wanting to get involved. Since becoming licensed, John enjoys exploring digital modes, packet bulletin board systems (BBSs), and wireless broadband systems, always searching for a way to get machines to talk to each other.

John is excited to help move 44Net operations forward securely, efficiently, and reliably, and he looks forward to engaging with the 44Net community and its pool of talent, experience, and expertise. Welcome to the team, John!

I am very, very encouraged that ARDC has hired a staffer with *specific responsibility within ARDC* for administering, growing, and promoting the use of 44Net. Kudos ARDC for this, and welcome KI5QKX!

KI5QKX becoming licensed specifically to experiment with and use digital / data / networking modes is another illustration of a trend I've been observing of techies and hackers getting their Amateur Radio license to experiment with *their specific interests* - data / digital / hacking / making, etc. rather than the traditional reasons for becoming an Amateur Radio Operator.

I've already had one encouraging email exchange with KI5QKX and I hope to have many more as 44Net continues to evolve and, hopefully, the 44Net VPN project graduates from beta testing into a service offered for Amateur Radio by ARDC.

[UniCIOGS - University Class Open Ground Station](#)

My thanks to the upcoming meeting announcement of the MicroHAMS Amateur Radio club for the pointer to this very interesting development!

An open source ground station project focused on amateur radio satellites!

Got CubeSats? Or any satellite at all that uses standard amateur bands? Then do we have a professional-grade, flexible ground station for you!

There is an amazing open source project called the [Satellite Network Open Ground Station \(SatNOGS\)](#) run by the [Libre Space Foundation](#). This world-wide network of hundreds of open source ground stations gives amateur radio satellites an incredible global ground station network. It's an incredible resource to amateur radio and open source groups around the world.

SatNOGS is receive only for many reasons, including regulatory compliance. As a satellite operator, however, we need to transmit commands to our satellite in order to operate it. When we realized that we could "piggyback" a transmitter system on top of a SatNOGS station, we started the University Class Open Ground Station (UniCIOGS). UniCIOGS is a semi-professional, configurable, and open source ground station that can be built for less than \$20,000.

UniCIOGS is design, built, and operated by the students of the [Portland State Aerospace Society \(PSAS\)](#), an interdisciplinary open source student project at [Portland State University](#). PSAS students also design, build, and fly [OreSat CubeSats](#), including OreSat0, Oregon's first satellite!

The first prototype UniCIOGS is on the roof of the Portland State University Engineering Building ([1930 SW 4th Avenue](#)). Several other universities around the world are now building their versions of this design, including The Mullard Space Science Lab at University College London and Bronco Space at Cal Poly Pomona.

Status: Operational! We're already tracking and receiving data from satellites with amateur radio.

There's more info on the UniCIOGS website. With last week's mention of the development of HuskySat-2 at the University of Washington in Seattle, I'll guess that UniCIOGS will be of significant interest to support HuskySat-2.

There was no mention of this MicroHAMS meeting being open to the public, so I'm not posting meeting information.

Galactic Neutral Hydrogen Structures Spectroscopy and Kinematics: Designing a Home Radio Telescope for 21 cm Emission

Email from a mutual friend of Dewayne Hendricks WA8DZP (Silent Keyboard) and I:

I wish Dewayne was around to see this.

When I was an undergrad a couple of us built a simple radio telescope with some spare parts and a homemade antenna to "listen" to Jupiter and the Sun. Barebones and unimpressive, but the times have changed.

Here's a guy with a credible, well-documented, telescope to look at the 21cm line locally ($Z = 0$). Very sweet.

<https://arxiv.org/abs/2411.00057>

In 1946, [Project Diana](#) required a major US government effort, a huge radar array, 50 kW of transmit power, and likely a budget of a few million dollars to bounce a simple RADAR signal (pulse) off the moon from a US Army facility in New Jersey.

78 years later, an Amateur Radio friend isn't just bouncing simple signals off moon, they're exchanging data (not much, admittedly) using a folding dish the size of a golf umbrella, a modest amount of transmit power, customized digital signal processing software, a reasonable computer, and powering all of it from a standard AC power outlet. They're doing all of this from the confines of a suburban back yard in the Pacific Northwest.

In 1946, there were a handful of computers in the world. Now I wear a more sophisticated computer on my wrist every day, which I use mostly to tell me the time and alarms to remind me to feed our fussy cats on schedule.

The technological capabilities we "civilians" have available to us in this era... is just astonishing. Not quite indistinguishable from magic to my 10 year

old self in 1970... but give it a few more decades and it probably will be.

Baofeng DM-1701 Modified for M17

Wojciech Kaczmarek SP5WWP (posting as M17 Project) on Mastodon:

M17 as received with two SDRs, transmitted with a Baofeng DM-1701. Excellent eye plot! Slight underdeviation will be fixed soon. Transmission quality is comparable to that of CS7000 (both radios run OpenRTX open-source alternative firmware) at significantly lower price.

The context here is “lower price than the [Connect Systems CS7000 M17](#)” which comes from the factory capable of M17.

Details of the modifications are on GitHub - [M17-Project / DM-1701_mod](#)

As with other modifications for M17 on other portable radios, this modification requires steady hands, good lighting and magnification to see what you’re doing, and the ability to solder to fine-pitch surface mount components.

Western Washington Amateur Television Society

Club Call Sign: WW7ATS

Net Audio Coordination on SeaTac Repeater: 147.08+ MHz, CTCSS: 103.5

Nets: Wednesday and Saturday at 20:00 Pacific Timezone
Greater Seattle Area, Washington

Analog Video Frequencies

434 MHz Input - Horizontal Polarization
1253.25 MHz Output - Vertical Polarization

Digital Video Frequencies

435.5 MHz Input - Horizontal Polarization
1255.5 MHz Output - Vertical Polarization

Welcome!

The Western Washington Amateur Television Society (WWATS) is a group of amateur radio operators in the Puget Sound area with a common interest in amateur television. We transmit and receive fast-scan full color video pictures and have an ATV repeater on Cougar Mountain east of Seattle. We are currently in the process of transitioning from analog video to digital video. While this is happening, there may be some changes to frequencies and other settings. See the DATV page for the latest updates.

The ATV repeater is turned on during our Wednesday and Saturday evening nets, and produces wonderful signals.

We hold our nets on Wednesday and Saturday evenings at 20:00 Pacific. The audio portions of our nets are conducted with the assistance of the SeaTac Repeater Association on 147.08 MHz. Visitors are welcome. We would be delighted to have you join our Wednesday and Saturday evening nets. For those who have a hard time receiving our over the air video broadcasts, we also make an attempt to do a live stream of our nets. Check the streaming page!

WWATS email address: info@wwats.net

I saw a brief mention in an email newsletter of the Amateur Radio Television (ATV) activity in Seattle, and *this time* I took the time to do a web search instead of just thinking “hmmm, that’s interesting”. I’m ashamed to say that in the 30+ years I lived in the Seattle, Washington metro area and was an active Amateur Radio Operator... I was unaware of the WWATVS and its activities. At any time I could have gotten curious to see if there was Amateur Television activity in the Seattle area and looked it up... but I didn’t.

I think that groups like WWATVS who are now operating their systems as *Digital* Amateur Television have a golden opportunity to broaden the interest in their activity if they publish and promote the ability to receive their video transmissions with an inexpensive Software Defined Receiver and an inexpensive computer such as a Raspberry Pi. The current generation’s preferred media is video... and if Amateur Radio can make that connection of video... *on Amateur Radio spectrum*, they might get interested.

AMSAT 42nd Space Symposium Presentations Now Available

AMSAT News Service Weekly Bulletin ANS-308:

The fifteen live presentations given at the recent AMSAT 42nd Space Symposium are now available online for viewing. The URL’s for presentations on Day 1 and Day 2 are shown along with the approximate timeline for each presentation.



Also available is the Symposium Banquet keynote address by Brian Abbott, NA7D, and the AMSAT General Meeting conducted by AMSAT President Robert Bankston, KE4AL.

Day 1

AMSAT-UK Payload on Jovian-1 CubeSat
David Bowman, G0MRF
0:00:58

CARD-SAT®: A Step Forward for Satellite Miniaturization
Adrian Totu, YO3HOT
0:58:15

Working QO-100 from Beyond the Nominal Footprint
Graham Shirville, G3VZV
1:18:55

AMSAT & ARISS Over the Past 40 Years
Frank Bauer, KA3HDO
2:01:20

MO-122 (MESAT1) Commissioning Recap
Mark Hammond, N8MH
2:35:05

AMSAT-HB Update
Michael Lipp, HB9WD
3:08:05

Fox Plus Update
Mike Moore, K4MVM
3:24:45

Day 2

AMSAT CubeSatSim Education Update and Software Overview
Alan Johnston, KU2Y
0:00:48

Integration of the AMSAT CubeSat Simulator for Education and Research
Rachel Jones, KO4HLC
0:44:00

ARISS Engineering Update – ISS, Lunar, and Commercial Activities
Randy Berger, WA0D
1:47:00

Automation and Remote Control of the Inter-Operable Radio System (IORS) on the ISS
Chris Thompson, VE2TCP/G0KLA
2:51:56

Getting Ready to Receive HamTV from the ISS
Graham Shirville, G3VZV
3:36:00

GOLF-TEE Flight Software and Bus Overview
Burns Fisher, WB1FJ
4:22:55

Determination of Orbiting Spacecraft Space Vectors Solely from In-flight Position Measurements
Joseph DiVerdi, K0NMR
5:20:00

AMSAT Engineering Update
Jerry Buxton, N0JY
6:02:00

AMSAT Annual General Meeting & Awards Ceremony
Robert Bankston, KE4AK, AMSAT President
7:15:30

Banquet Keynote

Brent Abbott, NA7D, Chief Revenue Officer , Rogue Space
0:00:45

I look forward to viewing several of these videos.

Leave a comment

Share

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything!*
- **Annual Founding Members who generously support Zero Retries financially:**
 - Founding Member 0000 - Steven Davidson K3FZT (Renewed 2024)
 - Founding Member 0001 - Randy Smith WU2S (Renewed 2024)
 - Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2024)
 - Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2024)
 - Founding Member 0004 - William Arcand W1WRA (Renewed 2024)
 - Founding Member 0006 - Todd Willey KQ4FID (Renewed 2024)
 - Founding Member 0007 - Merik Karman VK1DF / VK2MKZ (Renewed 2024 *with two Founding Member subscriptions!*)
 - Founding Member 0008 - Prefers to Remain Anonymous 14 (Renewed 2024)
 - Founding Member 0009 - Prefers to Remain Anonymous 19
 - Founding Member 0011 - Rick Prelinger W6XBE (New 2024)
 - Founding Member 0012 - Ryan Tolboom N2BP (New 2024)
- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your [QRZ](#) page (or other web presence) and include a link:

<https://www.zeroretires.org>

- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR: Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- [Dan Romanchik KB6NU](#) mentions “Zero Retries Interesting” topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Jeff Davis KE9V](#) also mentions “Zero Retries Interesting” topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Amateur Radio Weekly](#) by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories that often feature “Zero Retires Interesting” topics.
- [Experimental Radio News](#) by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- [RTL-SDR Blog](#) - *Excellent* coverage of Software Defined Radio units.
- [TAPR Packet Status Register](#) has been published continuously since 1982.
- [Hot Iron - The Journal of the Constructor's Club](#) is a delightful quarterly newsletter.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- [HB9BLA Wireless](#) by Andreas Spiess HB9BLA
- [KM6LYW Radio](#) by Craig Lamparter KM6LYW (home of the [DigiPi project](#))
- [Modern Ham](#) by Billy Penley KN4MKB
- [Tech Minds](#) by Matthew Miller M0DQW

These podcasts regularly feature Zero Retries Interesting content:

- [Store and Forward](#) - a podcast about the past and future of amateur radio, by Kay Savetz K6KJN (curator of the [Digital Library of Amateur Radio and Communications](#)) and Steve Stroh N8GNJ (Editor of Zero Retries).
- [Ham Radio Workbench](#) by George Zafiropoulos KJ6VU (and friends)
- [Foundations of Amateur Radio](#) by Onno Benschop VK6FLAB

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join **2200+** other subscribers:

Subscribe now

Please tell your co-conspirators about Zero Retries — just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy — just click:

Leave a comment

If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Social Media:

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

[Zero Retries / N8GNJ on Mastodon](#)

Zero Retries (N8GNJ) is also on Bluesky — [@n8gnj](#) — just click:

[Zero Retries / N8GNJ on Bluesky](#)

Email issues of Zero Retries are “instrumented” by [Substack](#) to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) — *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs in Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham ([The City of Subdued Excitement](#)), Washington, USA, and linked to the Internet via [Starlink Satellite Internet Access](#).

2024-11-15

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Footnotes for this Issue

[1](#)

Our vehicle has been broken into twice - once in our driveway at home, and once when parked in a lot at a hotel in Portland, OR to ransack for any sellable items. To date we've lost things like a good flashlight, car chargers, emergency medication, prescription sunglasses, etc. Thus she (and I) doesn't want a permanent radio installation in the vehicle.